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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

YAMNITZKY, MARIE ROSE

ART UNIT	PAPER NUMBER
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1774

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DATE MAILED: 03/25/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary

Application No.

09/960,285

Applicant(s)

TSUBOYAMA ET AL.

Examiner

Marie R. Yamnitzky

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09/24/01, 11/23/01 & 12/18/01.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☒ Claim(s) 1-16 are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4. 6) ☐ Other:

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1. This application contains claims directed to the following patentably distinct species of the claimed invention: a metal coordination compound of formula (1) and a luminescence device comprising the compound wherein, in formula (1):

M is one of Ir, Rh or Pd;

CyN is one of the last six formulae on page 23; and

CyC is one of the first thirteen formulae on page 23.

Applicant is required under 35 U.S.C. 121 to elect a single disclosed species (i.e. one possibility for each of M, CyN and CyC) for prosecution on the merits to which the claims shall be restricted if no generic claim is finally held to be allowable. In addition, applicant is required to select an ultimate species that will be used as the starting point for search and examination purposes. Currently, claims 1 and 8-10 are generic.

Applicant is advised that a reply to this requirement must include an identification of the species that is elected consonant with this requirement, and a listing of all claims readable thereon, including any claims subsequently added. An argument that a claim is allowable or that all claims are generic is considered nonresponsive unless accompanied by an election.

Upon the allowance of a generic claim, applicant will be entitled to consideration of claims to additional species which are written in dependent form or otherwise include all the limitations of an allowed generic claim as provided by 37 CFR 1.141. If claims are added after the election, applicant must indicate which are readable upon the elected species. MPEP § 809.02(a).

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Should applicant traverse on the ground that the species are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the species to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103(a) of the other invention.

2. During a telephone conversation with Jason Okun on 03/14/03, a provisional election was made with traverse to prosecute the species in which M is Ir, CyN is "Pr" and CyC is "Tn1". Claims 1-16 read on the elected species. (With respect to the properties recited in claims 2-7 and 11-16, some of ultimate species within the scope of the elected species possess the recited properties while other ultimate species do not.) Compound 14 as shown on page 40 of the specification was selected as the ultimate species. Affirmation of this election must be made by applicant in replying to this Office action.

3. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

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4. The disclosure is objected to because of the following informalities:

Page 21 lines 9-11 describe Figures 1A to 1C as showing a liquid crystal.

Some of the symbols in the tables on pages 25-33 are not clearly readable.

The description of Comparative Example 1 on page 27 is confusing in referring to metal coordination compounds 1-10 as "the Pt complex".

Appropriate correction is required.

5. Claims 2-7 and 11-16 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for metal coordination compounds of formula (1) wherein CyN and CyC are selected from the possibilities set forth on page 23 of the specification wherein the compounds have a molecular structure and peak emission wavelength as specified in claims 2, 5, 11 and 14, or having a ligand and peak emission wavelength as specified in claims 3, 4, 6, 7, 12, 13, 15 and 16, does not reasonably provide enablement for metal coordination compounds having the characteristics recited in claims 2-7 and 11-16 wherein the metal coordination compound is a compound of formula (1) and CyN and CyC are cyclic groups other than those set forth on page 23 or wherein the metal coordination compound is not a compound of formula (1). The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the invention commensurate in scope with these claims.

It is the examiner's position that it would take undue experimentation on the part of one of ordinary skill in the art to determine the scope of metal coordination compounds encompassed

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by these claims other than metal coordination compounds of formula (1) wherein CyN and CyC are selected from the possibilities set forth on page 23 of the specification given the numerous metals and coordinating ligands that can be combined to provide a metal coordination compound. The specification provides insufficient guidance to determine the scope of metal coordination compounds that meet the limitations of these claims other than compounds of formula (1) where CyN is one the last six formulae on page 23 and CyC is one of the first thirteen formulae on page 23.

6. Claims 1-16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The language “capable of including one or at least two non-neighboring methylene groups which can be replaced with...” as recited in claims 1 and 10 is confusing. The minimum and maximum number of methylene groups that can be replaced with –O–, –S–, etc. is not clear.

The limitations imposed by the phrase “free from a portion substantially causing intramolecular rotation” as recited in claims 2, 5, 11 and 14 are not clear. The term “substantially” is relative. It is not clear if the claim language excludes all portions causing intramolecular rotation, or if a portion “substantially” causing intramolecular rotation is a subset of a portion causing intramolecular rotation.

The limitations imposed by the requirement that the metal coordination compound exhibit a peak emission wavelength of at least 550 nm as recited in claims 2, 3, 5, 6, 11, 12, 14

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and 15 are not clear. The peak emission wavelength of a specific light-emitting metal coordination compound can differ depending upon the conditions under which the peak emission wavelength is measured. The claims do not specify under what conditions the compound must exhibit the peak emission wavelength and therefore the limitation is indefinite.

Claims 3, 6 and 12 recite "a liquid having a dipole moment". The term "liquid" should apparently read --ligand--.

Claim 8 is confusing in reciting "wherein a voltage is applied". It is not clear if claim 8 is directed to a method of using the device of claim 1, or if reference to a voltage is to be interpreted as a capable of statement (i.e. that the device is capable of luminescing upon application of a voltage between the pair of electrodes).

The limitations imposed by the phrase "adapted for use in a luminescence device" as recited in claims 10, 14 and 15 are not clear. It is not clear what constitutes an adaptation. It is not clear if there are some compounds represented by formula (1), in the case of claims 10-13, or having the specified molecular structure and peak emission wavelength, in the case of claim 14, or having the specified ligand and peak emission wavelength, in the case of claims 15 and 16, that are excluded by the "adapted for use" language.

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

8. Claims 1-7 and 9-16 are rejected under 35 U.S.C. 102(b) as being anticipated by Maestri et al. in *Advances in Photochemistry, Volume 17*, pp. 1-68 (1992).

Maestri et al. disclose $\text{Pd}(\text{tpy})_2$ which is a metal coordination compound of present formula (1) wherein M denotes Pd, CyN denotes "Pr" and CyC denotes "Tn1" wherein "Pr" and "Tn1" are as shown on page 23 of the present specification. For example, see Table 2 and see page 39 of the reference.

Maestri et al. also disclose $\text{Pt}(\text{tpy})_2$ which is a metal coordination compound of present formula (1) wherein M denotes Pt, CyN denotes "Pr" and CyC denotes "Tn1". For example, see Table 2 and see page 45 of the reference. While formula (1) as defined in claims 1 and 10 does not encompass $\text{Pt}(\text{tpy})_2$, $\text{Pt}(\text{tpy})_2$ is within the scope of the metal coordination compound as defined in claims 5-7 and 14-16.

These two prior art metal coordination compounds have a molecular structure free from a portion causing intramolecular rotation, and each contains a ligand having a dipole moment of 1.8 debye. The ligand "tpy" is the same ligand as in compound 11 as shown on page 39 of the present specification. The dipole moment for the ligand of compound 11 is 1.8 debye as disclosed in Table 12 on page 59 of the specification.

As disclosed in Table 2 of the reference, $\text{Pd}(\text{tpy})_2$ has a λ_{max} of 536 nm and $\text{Pt}(\text{tpy})_2$ has a λ_{max} of 570 or 578 when measured under the conditions specified in the table. Although the λ_{max}

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for Pd(tpy)₂ as disclosed in Table 2 is less than that required by claims 2-7 and 11-16, it is the examiner's position that it is reasonable to expect that Pd(tpy)₂ is capable of exhibiting a λ_{\max} of at least 550 nm under other conditions since the ligand is the same as that of compound 11. Compound 11 has a λ_{\max} of 552 nm when measured under the conditions used to obtain the data set forth in Table 11 on page 44 of the specification.

With respect to present claims 1-7 which are drawn to a luminescence device, the structure of the device is not limited beyond the requirement for a layer comprising the metal coordination compound of formula (1). Maestri et al. meet that requirement.

With respect to present claim 9 which requires a "means for driving" the luminescence device, any means capable of stimulating the metal coordination compound to luminescence is considered to meet the limitation of a means for driving. Since Maestri et al. must stimulate the metal coordination compounds in order to measure their emission properties, Maestri et al. anticipate a "means for driving".

9. Claims 5-7 and 14-16 are rejected under 35 U.S.C. 102(e) as being anticipated by Thompson et al. (US 2002/0034656 A1).

Thompson et al. disclose Pt(Thpy)₂ which is a metal coordination compound meeting the limitations of the metal coordination compound required for present claims 5-7 and 14-16. Thompson et al. disclose this compound for use as a light-emitting compound in an electroluminescent device. For example, see paragraphs [0143]-[0156] in the published application. The ligand "Thpy" is the same ligand as in compound 11 as shown on page 39 of

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the present specification. $\text{Pt}(\text{Thpy})_2$ has a molecular structure free from a portion causing intramolecular rotation. The ligand "Thpy" has a dipole moment of 1.8 debye as shown with reference to the ligand of compound 11 in Table 12 on page 59 of the present specification. This prior art subject matter has an effective U.S. filing date of March 23, 1999, having been disclosed in Thompson's priority application, U.S. Application No. 09/274,609.

Another metal coordination compound disclosed by Thompson et al. that meets the limitations of the compound required for at least present claims 5 and 14 is the compound represented by the formula shown in Fig. 43 of the published application. This compound has no portion causing intramolecular rotation and, as shown in Fig. 43, has a peak emission wavelength of greater than 550 nm in the solid state. This prior art subject matter has an effective U.S. filing date of December 1, 1999, having been disclosed in Thompson's priority application, U.S. Application No. 09/452,346. (The examiner does not know the dipole moments of the ligands of this prior art compound and therefore cannot say whether this compound meets the limitations of the compound required by claims 6, 7, 15 or 16.)

10. Claims 1, 8, 9 and 10 are rejected under 35 U.S.C. 102(e) as being anticipated by Grushin et al. (US 2002/0121638 A1).

Grushin et al. disclose a metal coordination compound meeting the limitations of the compound required by at least present claims 1, 8, 9 and 10, and disclose an electroluminescent device made with the compound. See compound 1-m as defined in Table 1 on page 3 and see

paragraphs [0018]-[0124]. The device of Sample 16 utilizes compound 1-m in the light-emitting layer.

(Grushin's compound 1-m does not meet the limitations of the compound required by claims 2, 5, 11 and 14 provided these claims exclude molecular structures having any portion causing intramolecular rotation. The examiner does not know the dipole moment of the substituted phenylpyrimidine ligands of Grushin's compound 1-m and therefore cannot say whether this compound meets the limitations of the compound required by claims 3, 4, 6, 7, 12, 13, 15 or 16.)

11. Claims 1-16 are rejected under 35 U.S.C. 102(e) as being anticipated by Igarashi et al. (US 2001/0019782 A1).

Igarashi et al. disclose various iridium complexes that meet the limitations of a metal coordination compound represented by present formula (1). For example, see formulae (1-3), (1-10), (1-11), (1-17), (1-20), (1-21), (1-36), (1-52) and (1-65). Igarashi et al. disclose these complexes for use as light-emitting materials in electroluminescent devices. For example, see paragraphs [0154] and [0157]. Of these complexes, at least the complex of formula (1-3) meets the limitations of the compound required by present claims 2-7 and 11-16; Igarashi's complex of formula (1-3) is the same as applicants' compound 11 as shown on page 39 of the present specification.

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. Claims 1-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Igarashi et al. (US 2001/0019782 A1) as applied above under 35 U.S.C. 102(e) and for the further reasons set forth below.

Igarashi et al. disclose specific examples of iridium complexes of present formula (1) and suggest other complexes. For example, Igarashi et al. do not explicitly disclose applicants' compound 14 of the formula shown on page 40 of the present specification, but such a compound is clearly suggested. For example, see Formula (11) on page 8 of the published application and paragraphs [0070]-[0074]. It would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to make other iridium complexes suggested by Igarashi et al. One of ordinary skill in the art would have been motivated to make iridium complexes suggested by Igarashi et al. other than those specifically disclosed in order to obtain a variety of iridium complexes suitable for use in an electroluminescent device. One of ordinary skill in the art would have reasonably expected that other compounds suggested by Igarashi et al. would have been suitable for use as light-emitting materials in electroluminescent devices.

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14. Applicant cannot rely upon the foreign priority papers to overcome the rejections based on the published application of Igarashi et al. because a translation of said papers has not been made of record in accordance with 37 CFR 1.55. See MPEP § 201.15.

15. Any inquiry concerning this communication should be directed to Marie R. Yamnitzky at telephone number (703) 308-4413. The examiner works a flexible schedule but can generally be reached at this number from 6:30 a.m. to 4:00 p.m. Monday, Tuesday, Thursday and Friday, and every other Wednesday from 6:30 a.m. to 3:00 p.m.

The current fax numbers for Art Unit 1774 are (703) 872-9311 for official after final faxes and (703) 872-9310 or (703) 305-5408 for all other official faxes. (Unofficial faxes to be sent directly to examiner Yamnitzky can be sent to (703) 872-9041.)

MRY
03/21/03



MARIE YAMNITZKY
PRIMARY EXAMINER

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